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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/878,815	06/11/2001	Hassan S. Hashemi	00CON159PC-CIP1	3172

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EXAMINER

OWENS, DOUGLAS W

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 03/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/878,815

Applicant(s)

HASHEMI ET AL.

Examiner

Douglas W. Owens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-127 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-16 is/are allowed.
- 6) ☒ Claim(s) 17-20,23-26,29,31-47,49 and 51-55 is/are rejected.
- 7) ☒ Claim(s) 21,22,27,48,50 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 17 – 20, 23 – 26, 29, 33 – 47, 49 and 51 – 55 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,117,705 to Glenn et al.

Regarding claims 17 and 44, Glenn et al. teach a structure (Fig. 5) comprising:

a substrate (200) having a top surface and a bottom surface;

a semiconductor die (100) attached to the top surface of the substrate;

a heat spreader (221; Col. 13, lines 6 – 9) attached to said bottom surface of said substrate;

a support pad (222) attached to said top surface of said substrate, said support pad being connected to said heat spreader;

a first plurality of vias (220) in the substrate;

said first plurality of vias providing a connection between said semiconductor die and said heat spreader.

Regarding claims 18 and 45, Glenn et al. teach a structure, wherein said heat spreader is attached to a printed circuit board (Col. 13, lines 17 – 21).

Regarding claim 19, Glenn et al. teach a structure, wherein said heat spreader is an electrical conductor.

Regarding claims 20 and 47, Glenn et al. teach a structure, further comprising a substrate down bond area attached to said top surface of said substrate.

Regarding claims 23 and 25, Glenn et al. teach a structure, wherein the heat spreader is attached to a printed circuit board by solder.

Regarding claim 24, Glenn et al. teach a structure, wherein the heat spreader is a thermal conductor.

Regarding claims 26 and 47, Glenn et al. teach a structure, wherein a second plurality of vias (203) provides a connection between a plurality of signal bond pads of the semiconductor die and a printed circuit board.

Regarding claims 29 and 51, Glenn et al. teach a structure, wherein the first plurality of vias provide a thermal connection between said semiconductor die and said heat spreader.

Regarding claim 33, Glenn et al. teach a structure, wherein the substrate comprises a ceramic material (Col. 4, lines 65 – 67).

Regarding claims 34 and 52, Glenn et al. teach a structure, wherein the second plurality of vias provide an electrical connection between a plurality of substrate bond pads (204) and the printed circuit board, wherein each of the plurality of substrate bond pads are electrically connected to the signal bond pads (103) of the semiconductor die.

Regarding claim 35, Glenn et al. teach a structure, wherein the second via abuts the substrate bond pad.

Regarding claims 36 and 41, Glenn et al. teach a structure, wherein the substrate bond pad is electrically connected to the signal bond pad of the semiconductor die by a signal bonding wire (208).

Regarding claims 37 and 53, Glenn et al. teach a structure, wherein said plurality of second vias provide an electrical connection between said plurality of signal bond pads of the semiconductor die and a respective one of a plurality of lands (209), said lands being electrically connected to the printed circuit board.

Regarding claim 38, Glenn et al. teach a structure, wherein the second via abuts the land.

Regarding claim 39, Glenn et al. teach a structure, wherein the second via provide an electrical connection between a substrate bond pad and a land, wherein the substrate bond pad is electrically connected to the signal bond pad of the semiconductor die, and wherein the land is electrically connected to the printed circuit board.

Regarding claim 40, Glenn et al. teach a structure, wherein the second via abuts the substrate bond pad and the land.

Regarding claims 42 and 54, Glenn et al. teach a structure, wherein the first plurality of vias comprise copper (Col. 13, lines 2 – 6).

Regarding claims 43 and 55, Glenn et al. teach a structure, wherein the second plurality of vias comprise copper (Col. 5, lines 10 – 18).

Regarding claim 49, Glenn et al. inherently teach a structure, wherein a ground bond pad on the die is electrically connected to the substrate down bond area by a

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down bonding wire, since one of the bond pads must be a ground bond pad, else the circuit would be in a floating state.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn et al.

Glenn et al. teach that the substrate may be made of laminate substrate from widely known vendors, such as Mitsubishi-BT, Arlon N and Nelco BT (Col. 4, line 65 – Col. 5, line 3). Glenn et al. do not teach that the substrate comprises an organic material or an FR4 based laminate. It would have been obvious to one of ordinary skill in the art to utilize an FR4 based or organic laminate, since these materials are well known and readily available from the companies suggested by Glenn et al. Moreover, the selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Allowable Subject Matter

5. Claims 1 – 16 are allowed.

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6. Claims 21, 22, 27, 48 and 50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not teach a structure including, "...said support pad being coupled to said die by a down bonding wire".

Response to Arguments

8. Applicant's arguments with respect to claims 17 – 27, 29 and 31 – 55 have been considered but are moot in view of the new ground(s) of rejection.

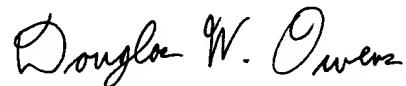
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W. Owens whose telephone number is 571-272-1662. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink that reads "Douglas W. Owens". The signature is written in a cursive, flowing style.

Douglas W Owens
Examiner
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DWO